

A Ten Years Retrospective and Cross Sectional Study of *Entamoeba histolytica* in Atsbi Wonberta Woreda at Mulu Assefa Hospital, Eastern Tigray Ethiopia

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ABSTRACT

Amebiasis is cosmopolitan in its distribution both in developed and developing countries. The aim of this study was to assess the prevalence of Entamoeba histolytica (E. histolytica) since 2007 to May 2017 at Mulu Assefa Hospital in Atsbi Wonberta Woreda, Eastern Tigray Ethiopia. This study showed that the prevalence rate of E. histolytica within ten years ranged from 15.08% to 72.60%. Out of these stools examined 6195(46.64%) were infected with E. histolytica with annual prevalence rate of 46.64%. Of these the prevalence rate of E. histolytica was 2913 (21.93%) for males and 3282 (24.71%) for females. The result showed that there was highest prevalence in spring 1983 (14.92%), followed by summer 1981 (14.91%), winter 1291 (9.71%) and least in autumn season 1184 (8.91%). The overall prevalence rate of the disease within the ten years, among different age groups in young (21-40 years) was highest 2175 (16.38%), followed by adult (≥ 41 years) 1863 (14.03%), moderate in child (0-11 years) 1250 (9.41%) and least in adolescence (12-19 years) 1043 (7.85%) out of 13283 total stool examined. The result of prospective laboratory assessment of five month (January to May 2017) on patient attended in the Hospital, showed that totally 685 patients were stools examined in the Hospital, out of these 226 were E. histolytica positive. There was higher prevalence in females than males. There was highest prevalence in young and least in adult and the overall prevalence was 32.99%. The prevalence of E. histolytica had association between sex, season and age groups at $p < 0.05$. As the respondents answered 84% of them were have knowledge on the mode of transmission, prevention method and risk factors that contribute for transmission of the disease. However, 16% the people had less awareness toward the disease. Therefore, protection of water sources from contamination and health education are needed to improve sanitation, personal hygiene and a proper usage of toilet to reduce infections of E. histolytica.

Keywords: Amebiasis, *Entamoeba histolytica*, Ethiopia, Prevalence, Prospective, Retrospective

INTRODUCTION

Amebiasis is caused by protozoan parasite, *E. histolytica* which is the most important human amoeba that causes amoebic dysentery, a serious medical problem in tropical and subtropical regions. Amebiasis was firstly recognized as a deadly disease by Hippocrates who was described a patient with fever and dysentery at 406 to 377 BC [1]. However, the pathogenic nature of *E. histolytica* first reported by Fedor Losch in 1875. He observed microscopically as coli but later the Latin name was given by Fritz Schaunin in 1903 [2].

E. histolytica is the second leading parasitic disease in the world next to malaria, mostly attack intestinal and rarely extra intestinal organs [3]. Majority of the infection of *E. histolytica* (80-90%) are asymptomatic [2]. The symptomatic diseases limited to intestinal with average incubation period of 1 to 4 weeks after infection. The symptoms show after the trophozoites invading intestine and penetrate mucosa. These include abdominal pain, fever, bloody diarrhea and weight loss. Extra intestinal amebiasis occurs in different organs like liver, brain, lungs and kidney. However, about 50% of extra intestinal amebiasis is liver abscess. The symptom of extra intestinal amebiasis includes weight loss, weakness, fever, fatigue, anemia, skin lesion, and liver abscess [4].

It is estimated that, 40-50 million cases of amoebic dysentery and liver abscess occur annually with 40,000-110,000 death per year worldwide [5]. This disease widely distributed in Africa mostly in tropical and subtropical and

prevalence is more than 30% [5]. In Europe and USA the prevalence is less than 5% but in tropical and subtropical more than 50% [6].

Amebiasis is also widely distributed in Ethiopia. As the general parasitological survey indicates the infection rate is variable. In a survey of 1850 school children in 50 farming community of central and north covering five administrative regions, *E. histolytica* was found in 94% of the community with prevalence rate 3 to 50%. Of these 19% infection was in the school children [7]. On another survey reported by Ethiopian Ministry of Health (MOH) in 1988-1889 over 80,000 new cases of amebiasis were detected in all age groups, even 3716 children under one year treated in the same year. As the survey of Blue Nile Gorge in Wollega indicated about 12% of 698 school children in 17 rural communities were infected with *E. histolytica* [7].

The disease is transmitted through fecal-oral route and consuming contaminated food and water. Out breaking of amebiasis is frequent during disaster, when people crowded in refugee camps, after flood and during famine and war. The prevalence of the disease is also closely associated with poor personal hygiene, use of night soil as fertilizer and homosexual male [8].

Even though several studies have been conducted in different part of Ethiopia, there was some areas still not assessed the prevalence of *E. histolytica* like Mulu Assefa Hospital in Atsbi Wonberta Woreda. Therefore, the objective of this study was to study the prevalence of *E. histolytica* on the study area and to find out relevant information. Collection of epidemiological data is necessary to develop effective strategies against *E. histolytica* control and prevention mechanism.

MATERIALS AND METHODS

Study area

This study was conducted in North Ethiopia, Eastern Tigray in Atsbi Wonberta Woreda at Mulu Assefa Hospital which is 852 km away from Addis Ababa and 72 km from Mekelle. Atsbi Wonberta is located in between the geographical coordinates (latitude: 13°54'-14°08'N and longitude: 39°62'-39°89'E) that is from southern to the northern and from western to eastern parts of the region, respectively. It has average annual temperature of 20-25°C and average annual rainfall is from 500-800 mm. The Atsbi Wonberta Woreda planning and finance report of 2016/2017 (unpublished) shows that 18 kebeles (lowest administrative unit of Ethiopia), of which 16 are peasant associations and the remaining two are urban administrative units (Figure 1).

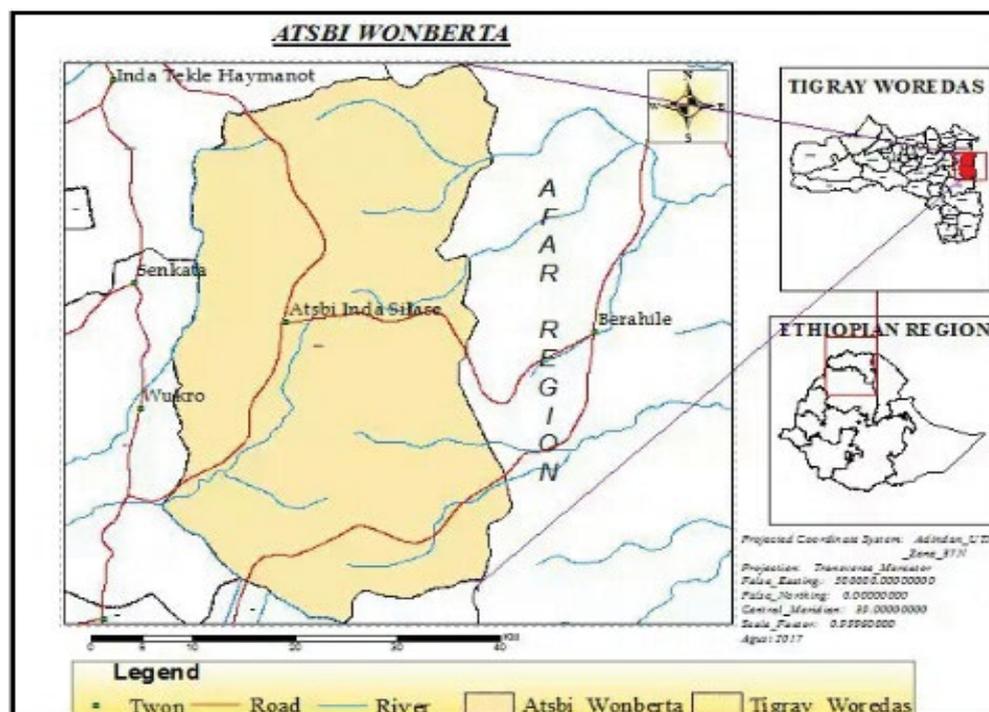


Figure 1: Location map of the study area

Methods of data collection

Secondary data collection

Secondary data was collected by taking the population that had been made stools examination since 2007 to 2016. Both *E. histolytica* positive and negative recorded in Atsbi Wonberta Woreda at Mulu Assefa Hospital was taken by sex, age groups and seasons.

Primary data collection

Laboratory assessment: It was done on the patients attended in Atsbi Wonberta Woreda at Mulu Assefa Hospital and stool examination was made from January to May 2017.

Preparation of faecal smears and identification of parasite: The stool samples were collected from the patient attended in the Hospital every day and immediately taken to the laboratory for microscopic examination using 10x objective for examination and 40x for identification of the parasites. Saline used for identification of trophozoites and iodine preparations was used for the identification of cysts. A little portion of the formed stool specimen was collected and mixed with the 3% iodine solution to form a smear for easy identification of the cyst of *E. histolytica*.

Questionnaire: To get relevant data, open and close ended questions totally six items with eighteen sub questions were disseminated for 368 respondents randomly by researcher. It was prepared in English language and translated in to Tigrigna language by English head department of Atsbi secondary and preparatory school teacher in order to avoid biases.

Data analysis

The retrospective and prospective data were analyzed using SPSS version 20. In order to test significant difference and associations among parameters like age, gender, season and years with prevalence of *E. histolytica*, Chi-square (χ^2) and one way ANOVAs were used. For statistical tests, a minimum significance level of $\alpha=0.05$ was used.

Ethical clearance

At the beginning of the study, the aim of the investigation was explained by the investigator to the individuals and public representatives in their local language (Tigrigna) and verbal individual consent was obtained.

RESULTS

Retrospective data of *E. histolytica*

Prevalence of *E. histolytica* by sex

The ten years retrospective study showed that, except in 2007 and 2016 in the rest six years the prevalence of the disease was higher in females than males. In addition to that the overall prevalence of the disease was higher in females than males. That was in females 3282 (24.71%) and in males 2913 (21.93%). The χ^2 test showed that there was significant association between genders and *E. histolytica* ($\chi^2=13283$, d.f.=3, $p<0.001$) (Table 1).

Prevalence of *E. histolytica* by year

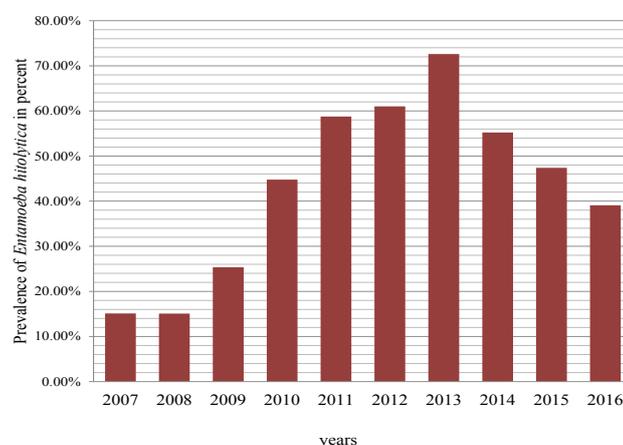
The ten years retrospective study showed that, the prevalence of the disease was varied within the ten years. It was increase from 2008 to 2011 and decrease in 2012. However, it increases dynamically in 2013 in alarming rate and again decrease in 2014 and 2015 but increase in 2016. The overall prevalence of the disease was highest in 2013 and least in 2008 (Figure 2).

Prevalence of *E. histolytica* by season

The ten years retrospective study showed that, the prevalence rate of *E. histolytica* was varied in different seasons. For example in 2007 and 2008 there was highest prevalence in autumn season and least in summer season, from 2009 to 2011 there was highest prevalence in spring season and least in winter season and from 2012 to 2015 there was highest in summer season and least in autumn season. However, the overall prevalence was highest in spring season 1983 (14.92%) and least in autumn 1184 (8.91%). The Chi square test revealed there was significant relationship among the different season and prevalence of *E. histolytica* ($\chi^2=4911.818$, d.f.=3, $p<0.001$). This indicates the prevalence of *E. histolytica* was seasonal dependent. There was highest prevalence in spring and least in autumn season as statistically compared (Table 2).

Table 1: Prevalence of *E. histolytica* by year and sex in Atsbi Wonberta Woreda at Mulu Assefa Hospital, 2007-2016

Years	<i>E. histolytica</i> positive			Total stool examined	Prevalence rate per year
	Male n (%)	Female n (%)	Total		
2007	62 (7.80%)	58 (7.30%)	120	794	15.11%
2008	71 (9.74%)	39 (5.35%)	110	729	15.08%
2009	149 (12.14%)	163 (13.24%)	312	1231	25.34%
2010	259 (20.35%)	311 (24.43%)	570	1273	44.77%
2011	394 (28.16%)	428 (30.59%)	822	1399	58.75%
2012	392 (29.85%)	409 (31.15%)	801	1313	61.01%
2013	524 (33.69%)	605 (38.91%)	1129	1555	72.60%
2014	432 (25.89%)	489 (29.32%)	921	1668	55.22%
2015	274 (20.25%)	367 (27.00%)	641	1353	47.38%
2016	356 (18.09%)	413 (20.99%)	769	1968	39.08%
Total	2913 (21.93%)	3282 (24.71%)	6195	13283	46.64%

**Figure 2:** Annual percentage prevalence of *E. histolytica* in Atsbi Wonberta Woreda at Mulu Assefa Hospital, 2007-2016

Prevalence of *E. histolytica* by age groups

The ten years retrospective study also showed that the prevalence rate of *E. histolytica* was varied in different age groups. For instance the prevalence in 2007 was high in young 46 (5.79%), next children 33 (4.16%), moderate in adult 22 (2.77%) and least in adolescent 18 (2.27%) out of 794 total stools examined. However, in 2005 there was highest prevalence in adult 354 (22.76%), next young 343 (22.06%), moderate in child 255 (16.39%) and least in adolescence 160 (10.29%) out of 1555 total stools examined. The overall prevalence rate of the disease within the ten years, among different age groups was highest in young 2175 (16.38%), next adult 1863 (14.03%), moderate in child 1250 (9.41%) and least in adolescence 1043 (7.85%) out of 13283 total stools examined (Table 3). The one way ANOVAs shows there was a significant relationship among the different age groups and prevalence of *E. histolytica* at mean square=2171.046, critical value=7214088.618 and $p < 0.001$.

Cross sectional data of *E. histolytica*

Prevalence of *E. histolytica* by sex and age groups

Laboratory assessment of five month (January to May 2017) on the prevalence rate of *E. histolytica* in Atsbi Wemberta Woreda at Mulu Assefa Hospital was carried out in patient attended in the Hospital. Among the total 685 patients stools examined, 226 were found to be *E. histolytica* positive. There was higher prevalence in females than males (Table 4). The overall prevalence of *E. histolytica* was 32.99% and it had association between sex and age groups ($\chi^2=677.112$, d.f.=7, $p < 0.001$).

Prevalence of *E. histolytica* by age groups

The result of prospective laboratory from January to May 2017 on the prevalence rate of *E. histolytica* in Atsbi Wemberta Woreda at Mulu Assefa Hospital showed that there was highest prevalence in young 73 (10.65%) and least in adult 44 (6.42%) (Figure 3).

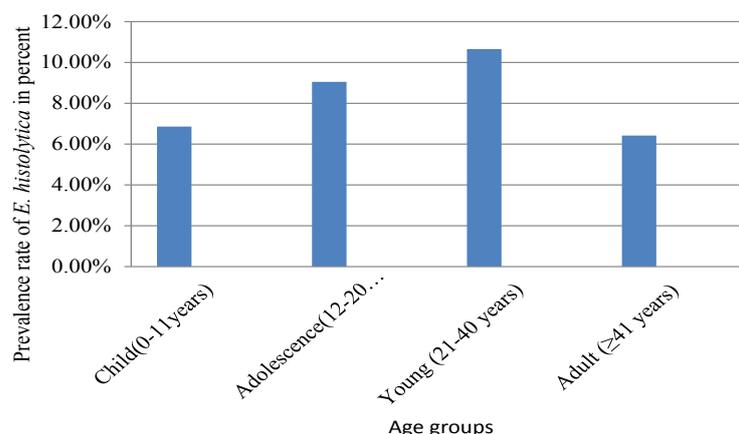


Figure 3: Prevalence of *E. histolytica* by age groups in Atsbi Wonberta Woreda at Mulu Assefa Hospital from January to May 2017

Table 2: Prevalence of *E. histolytica* by year and season in Atsbi Wonberta Woreda at Mulu Assefa Hospital, 2007-2016

Years	Transmission season																Total stool Examined
	Autumn				Winter				Spring				Summer				
	<i>E. histolytica</i> positive				<i>E. histolytica</i> positive				<i>E. histolytica</i> positive				<i>E. histolytica</i> positive				
	M	F	Total	%	M	F	Total	%	M	F	Total	%	M	F	Total	%	
2007	15	24	39	4.91	21	17	38	4.78	16	10	26	3.27	10	7	17	2.14	794
2008	20	9	29	3.97	22	8	30	4.11	7	10	17	2.33	22	12	34	4.66	729
2009	17	14	31	2.51	40	37	77	6.25	59	72	131	10.61	33	40	73	5.93	1231
2010	35	39	74	5.81	25	20	45	3.53	105	140	245	19.24	94	112	206	16.18	1273
2011	48	60	108	7.71	97	87	184	13.15	103	124	227	16.22	146	157	303	21.65	1399
2012	91	106	197	15.0	80	82	162	12.33	68	58	126	9.59	153	163	316	24.06	1313
2013	73	74	147	9.45	124	152	276	17.74	172	200	372	32.92	155	179	334	21.47	1555
2014	107	114	221	14.53	92	83	175	11.51	120	174	294	19.34	113	163	276	18.15	1520
2015	59	77	136	10.05	59	65	124	9.16	71	80	151	11.16	85	145	230	16.99	1353
2016	96	106	202	10.26	77	103	180	9.14	169	225	394	20.02	88	104	192	9.75	1968
Total	561	623	1184	8.91	637	654	1291	9.71	890	1093	1983	14.92	899	1082	1981	14.91	13283

Table 3: Prevalence of *E. histolytica* by year and age groups in Atsbi Wonberta Woreda at Mulu Assefa Hospital, 2007-2016

Years	Age groups								Total stool examined
	Child (0-11) years		Adolescence (12-20) years		Young (21-40) Years		Adult (≥ 41) years		
	<i>E. histolytica</i>		<i>E. histolytica</i>		<i>E. histolytica</i>		<i>E. histolytica</i>		
	+ve	-ve	+ve	-ve	+ve	-ve	+ve	-ve	
2007	33 (4.16%)	187	18 (2.27%)	102	46 (5.79%)	260	22 (2.77%)	126	794
2008	12 (1.65%)	67	13 (1.78%)	73	51 (6.99%)	286	34 (4.63%)	193	729
2009	48 (3.9%)	138	79 (6.42%)	227	91 (7.39%)	262	99 (8.04%)	287	1231
2010	90 (7.07%)	112	83 (6.52%)	103	211 (16.58%)	262	183 (14.38%)	229	1273
2011	172 (12.29%)	141	125 (8.93%)	102	301 (21.52%)	248	169 (12.08%)	141	1399
2012	184 (14.01%)	115	121 (9.22%)	77	263 (20.03%)	167	234 (19.82%)	152	1313
2013	255 (16.39%)	101	160 (10.29%)	63	343 (22.06%)	136	354 (22.76%)	143	1555
2014	226 (13.55%)	174	160 (9.59%)	123	343 (20.56%)	264	213 (12.77%)	165	1668
2015	97 (7.17%)	108	124 (9.16%)	138	205 (15.15%)	359	212 (15.67%)	110	1353
2016	136 (6.91%)	142	160 (8.13%)	168	321 (16.31%)	337	343 (17.43%)	361	1968
Over all prevalence	1250 (9.41%)	1285	1043 (7.85%)	1176	2175 (16.38%)	2581	1863 (14.03%)	1907	13283

Note: +ve=Positive; -ve=Negative

Knowledge on *E. histolytica* transmission

Response as sharing of material such as spoon or eating utensil was 95.10% which becomes to 84% when includes use of night soil as fertilizer, anal intercourse, unsafe sexual inter course like homo sexual in male and blood transmission. But 'no knowledge' was also as high as 16% (Table 5).

Out of 368 respondents 350(95.10%) affirmed on factors contribute for prevalence of *E. histolytica* of with poor habit of washing of hand before and after meal, 97.82% poor habit washing of hand after toilet, 93.75% low management of toilet, 98.64% poor personal hygiene and environmental sanitation (Table 6).

The best preventive measure, washing of hand before and after meal was 363 (98.64%) of the respondent and followed by using toilet regularly that amounted to 355 (96.46%). The 364 (98.91%) respondent responded that keeping environmental sanitation can prevent *E. histolytica* (Table 7).

Table 4: Prevalence of *E. histolytica* by sex and age groups in Atsbi Womberta Woreda at Mulu Assefa Hospital, January to May 2017 (n=685)

Sex	Age groups				Total <i>E. histolytica</i> positive	Prevalence (%)
	Child (0-11) years	Adolescence (12-20) years	Young (21-40) years	Adult (≥ 41) years		
Male	20 (2.91%)	28 (4.08%)	33 (4.82%)	27 (3.94%)	108	15.76
Female	27 (3.94%)	34 (4.96%)	40 (5.84%)	17 (2.48%)	118	17.26
Total	47 (6.86%)	62 (9.05%)	73 (10.65%)	44 (6.42%)	226	32.99

Table 5: Knowledge on *E. histolytica* transmission in Atsbi Womberta Woreda, January to May 2017 (n=368)

Transmission agents	% respondents	
	Yes n (%)	No n (%)
Unsafe sexual intercourse like homo sexual in male	68 (18.47%)	300 (81.53%)
Anal intercourse	290 (78.80%)	78 (21.2%)
Sharing of material such as spoon or eating utensil	350 (95.10%)	18 (4.9%)
From mother to child during pregnant	10 (2.71%)	358 (97.29%)
Insect bite	5 (1.35%)	363 (98.65%)
Blood transmission	200 (54.34%)	168 (45.66%)
Use of night soil as fertilizer	356 (96.73%)	12 (3.27%)

Table 6: Frequency of responses on *E. histolytica* risk factors in Atsbi Womberta Woreda, January to May 2017 (n=368)

Risk factors favoring <i>E. histolytica</i> transmission	% respondents	
	Yes n (%)	No n (%)
Poor habit of washing of hand before and after meal	350 (95.10%)	18 (4.9%)
Poor habit washing of hand after toilet	360 (97.82%)	8 (2.18%)
Low management of toilet	345 (93.75%)	23 (6.25%)
Poor personal hygiene and environmental sanitation	363 (98.64%)	5 (1.36%)
Consuming of uncooked vegetable	358 (97.28%)	10 (2.72%)
Eating leftover food from day before	364 (98.91%)	4 (1.09%)
Drink well water, pond, lake water	348 (94.56%)	20 (5.44%)

Table 7: Percentage of *E. histolytica* preventive measures reported by respondents in Atsbi Womberta Woreda, January to May 2017 (n=368)

Preventive measures	% respondents	
	Can prevent n (%)	Cannot prevent n (%)
Washing of hand before and after meal	363 (98.64%)	5 (1.36%)
Washing of hand after toilet	365 (98.18%)	3 (1.82%)
Cutting of finger nail	360 (97.82%)	8 (2.18%)
Keeping environmental sanitation	364 (98.91%)	4 (1.09%)
Washing of cloths	350 (95.10%)	18 (4.9%)
Regular usage of toilet	355 (96.46%)	13 (3.54%)

DISCUSSION

Entamoeba histolytica is still one of the major health problem and the second leading parasitic disease in the world next to malaria, mostly attack intestinal and rarely extra intestinal organs [3]. It is estimated that, 40-50 million cases of amoebic dysentery and liver abscess occur annually with 40,000-110,000 death per year worldwide [5]. *Entamoeba histolytica* infects approximately 10% of the world population and its prevalence varies among countries and areas with different socioeconomic conditions and poor hygiene practices [9].

As compared with the study done in human at private fertilizer company in Hospital in Pakistan the overall prevalence among 4712 stools sample was 52.1%. They suggested that the result was due to low level of hygiene, poor sanitary condition poor socioeconomic status of the society [10]. Similarly in the present study the prevalence was 46.64% and varies among seasons, years, age groups and between sexes. This could be due to variation in environmental condition and less awareness of the people.

In contrast to the present finding low prevalence of *E. histolytica* was reported in different part of the world. A study done in Nigeria, found 27% of school age children had *E. histolytica* infection [11]. This lower prevalence is further supported by the study done in Kenya among residents of Njoro district where only 21% of patients attending in the district Hospital tested positive for *E. histolytica* [12]. According to the study done in different part of Ethiopia the prevalence of *E. histolytica* has been found around 10.3% [13]. As the parasitological survey conducted in 1850 school children, in 50 farming community of Central and North covering five administrative regions, the *E. histolytica* was found in 94% of the community with prevalence rate 3 to 50%. Of these 19% were school children infected [7].

The practices of the people in Ethiopia are conducive to the spread of human parasitic infections. In Ethiopia, most of the people live in rural areas depending on agriculture for their livelihood. This brings the people in close contact with soil which is contaminated with cyst of human parasites, thus disposing them to frequent infection by this parasite.

A study by Fontanet et al. [14] showed that 24.6% prevalence of *E. histolytica* was reported among employees of Akaki fiber Factory and Wonji Sugar Estate, with a probable association of amebic and HIV infections. Similar Hospital based retrospective study was carried out for the prevalence of intestinal parasites in Axum Saint Marry Hospital, Tigray region from September 2013 to August 2015. The dominant parasites detected were *E. histolytica* with 50.8% [15]. This finding is consistent with the present study. This transmission of parasite is possibly because of contaminated environs with cysts.

In contrast to the present finding, very low prevalence of *E. histolytica* was reported in different parts of Ethiopia. For example, in Gondar 1.5% out of 1203 students sampled were positive for *E. histolytica* [16]. Other analysis of three years medical admissions record to Gondar Hospital revealed 2.5% amebic dysentery and 1.5% amebic liver abscess out of 11750 admissions [17].

The prevalence of *E. histolytica* since 2007 to 2016 in the present study area was found to be 46.64%. The comparative high prevalence of *E. histolytica* infection were observed in this study could be attributed to such predisposing factors which are prevailing in the study communities such as ignorance, unhealthy socio-cultural practices, poor drainage system, unhygienic methods of disposing human stools and refuse health education, poverty, inadequate healthcare facilities as well as low standard of personal hygiene.

The overall prevalence of *E. histolytica* in the present study area was found higher in females as compared to males by 2.78%. The prevalence of *E. histolytica* in relation to sex showed that out of the 133 male examined, 89 (66.92%) were positive or infected, while of 145 females examined, 99 (68.28%) were infected. This is due to females are more likely to be found working in farms and house hold activities than males. Females are also culturally expected to be involved more in domestic chores like changing babies' diapers, preparing foods and cooking. These may bring them into constant contact with contaminated soil and water which potentially promote oral transmission of the disease through contaminated hands. This might account for the slightly higher level of infection among the female population similar to the report by Haque et al. [18] and contrary to the report [19,20]. The high prevalence of infection observed in males in the present study may be attributed to the fact that they are more adventurous than females' counterparts and have a greater tendency of indulging in outdoor activities.

The ten years retrospective study also showed that the prevalence rate of *E. histolytica* was varied in different seasons. For instance, the prevalence rate of *E. histolytica* increased from May to August, which is hot and humid season followed by winter season. This is due to the reason that diarrheal diseases are more in this season because of there was more contamination of drinking water by various means which is similar to the study made in Philippines and South

East Asian as reported by Natividad et al. [21].

In the study area the prevalence rate of *E. histolytica* within ten years in different age groups were varied. For instance, the prevalence in 2007 was high in young, next children, moderate in adult and least in adolescent from the total stool examined. However, in 2013 there was highest prevalence in adult next young, moderate in child and least in adolescence from the total stool examined. The overall prevalence rate of the disease within the ten years, among different age groups was highest in young, next adult, moderate in child and least in adolescence from total stool examined.

The current retrospective study revealed moderate prevalence in children 9.41% and highest in young 16.38%. This is caused due to low awareness about managing of toilet, washing of hand before and after using toilet and not conscious of the need to take personal hygiene. Among all age groups the least prevalence was observed in adolescence. This could be attested to the fact that they are quite matured and are so conscious of the need to take personal hygiene more seriously as compared to the other age groups [11,22].

However, less than five years age groups were the most infected with *E. histolytica* in retrospective study as reported by Zahida et al. [10]. The study in Bangladesh also showed that infection with *E. histolytica* is most common among young children who are likely to come into contact with infected material as they crawl on the ground or play games outdoors. They are likely to put play items in their mouths and eat with unwashed hands [10,18].

In the present study the prevalence of *E. histolytica* was varied within the ten years. This variation of the prevalence of the disease was due to high prevention and controlling of the disease by the people in some year and less in other years. This result was similar to the finding of Benetton et al. [23] in Malaysia. As these authors reported there was high prevalence of amoebic dysentery was recorded in tropical highland and mountainous area (21%) and among aborigines population (18.5%) while the prevalence was very low in urban community in Kuala Lumpur (0.4%), in the year 2002 to 2006. This variation was related to the difference in environmental and personal hygiene practices.

The five month prospective laboratory assessment in the study area revealed that the prevalence rate of *E. histolytica* was similar to the result of present ten years retrospective study between sex and among age groups. There was high prevalence in females than males by 1.5%. It was due to females engaging more in door activities and easily contact with food and drinking materials than males. This is similar to the report of Nyenke et al. [24] in Degema and environs where they reported that females were more infected than males and there was higher prevalence in young (10.65%) than in adult (6.42%).

In the present investigation, microscopy diagnosis revealed that the overall prevalence of *E. histolytica* was 32.99%. Similarly, the highest prevalence rates of *E. histolytica* (36.6%) was reported in Brazil that were detected using the *E. histolytica* kit from the state of Rondônia in Ariquemes and 19.4% from residents of Monte Negro [25].

As the respondents responded above 84% had knowledge on the mode of transmission and prevention method about *E. histolytica* as well as on the factors that contribute for transmission of the disease. However, due to less awareness and give less emphasize about the disease like poor personal hygiene and environmental sanitation, poor habit of washing hand before and after meal, low management of toilet, consuming of un-cooking vegetable and eating leftover food from day before and foods easily contaminated and spoilage. Then the prevalence rate was high in the study area. Similarity findings also reported that rural communities often lack basic social amenities [26]. These communities lack basic healthcare services, limited access to good and healthy toilet facilities, lack of pipe borne water and a host of limited access. The prevailing deplorable state of infrastructure in the communities surveyed has supported the transmission of *E. histolytica*.

Infection of man by *E. histolytica* closely associated with the sanitary habits of people in handling food and drinks. Children usually are in or near the hut in close contact with soil contaminated with faeces where cysts of *E. histolytica* may bind. Therefore, environmental sanitation including the change in habit of defecation, make and use latrines instead of open fields, protect the source drinking water, and follow the guidelines of cleanliness are very important in reducing the transmission of amoeba parasites.

CONCLUSION

The rate of prevalence was varies between sex, among season, age group and years. As the result of this retrospective study of the overall prevalence of *E. histolytica* showed, there was high prevalence in females than males and there was high in spring season and least in autumn. As also seen based on age group there was highest prevalence in young

and least in adolescence. There exists as well, proper knowledge on the mode of transmission, factors that contribute for transmission and prevention method as well. However, control activities were not observed at grass root level and hence high prevalence of the disease was observed in the study area. So, we recommend that community participation in control operations be encouraged.

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